Virginia Department of Health
Viral Hemorrhagic Fever (VHF): Overview for Healthcare Providers

	Filoviruses (Ebola and Marburg)	Arenaviruses (Lassa and New World hemorrhagic fever)	Bunyaviruses* (Rift Valley fever)	Flaviviruses* (Yellow fever; Omsk hemorrhagic fever; Kyasanur Forest disease)
Route of Infection	Vector is unknown. Person-to-person transmission by direct contact with blood, secretions, excretions or tissues of infected persons.	Inhalation of aerosols or ingestion of food contaminated with rodent excreta; direct contact of rodent excreta with abraded skin or mucous membranes; person-to-person transmission by direct contact with blood, secretions or tissues of infected persons.	Bite of infected mosquito; inhalation of aerosols from an infected animal carcass; direct contact with infected animal tissue; ingestion of contaminated raw milk.	Yellow fever: Bite of infected mosquito Omsk and Kyasanur: Bite of infected tick
Communicability	Person-to-person transmission generally occurs beginning with onset of symptoms and continuing through clinical illness.		No person-to-person transmission, but lab workers may be infected via contact with specimens, contaminated equipment, or aerosols.	
Case Fatality	Ebola: 50-90% Marburg: 23-70%	Lassa: 15-20% New World: 15-30%	<1%	Yellow fever: 20% Omsk: 0.5-10% Kyasanur: 3-10%
Incubation Period	Ebola: 2 to 21 days Marburg: 2 to 14 days	Lassa: 5 to 16 days New World: 7 to 14 days	2 to 6 days	Yellow fever: 3 to 6 days Omsk and Kyasanur: 2 to 9 days
Clinical Manifestations	Ebola: High fever and severe prostration; diffuse maculopapular rash which may occur by day 5 of illness; bleeding and disseminated intravascular coagulation. Marburg: High fever; myalgias; nonpruritic maculopapular rash of the face, neck, trunk and arms; bleeding and disseminated intravascular coagulation.	Lassa: Gradual onset of fever; nausea; abdominal pain; severe sore throat; conjunctivitis; ulceration of buccal mucosa; exudative pharyngitis; cervical lymphodenopathy. Late signs include severe swelling of head and neck; pleural and pericardial effusions. Hemorrhagic complications are less common. New World: Gradual onset of fever; myalgias; nausea; flushing of face/trunk; generalized lymphadenopathy; may develop petechiae, bleeding and CNS dysfunction.	Fever; headache; retro-orbital pain; photophobia; jaundice. Less than 1% develop hemorrhagic fever or encephalitis. Retinitis affects ~ 10%, which may occur at time of acute febrile illness or up to 4 weeks later.	Yellow fever: Fever; myalgias; facial flushing; conjunctival injection; patients recover or enter a short remission, followed by fever, relative bradycardia, jaundice, renal failure, hemorrhagic complications. Omsk: Fever; conjunctivitis; papulo-vesicular eruption on soft palate; marked hyperemia of the face/trunk, lymphadeno-pathy and splenomegaly; may develop pneumonia or nervous system dysfunction. Kyasanur: Similar to Omsk but biphasic: Phase one lasts 6-11 days, followed by an afebrile period of 9-21 days. Patients may relapse and develop meningoencephalitis.
Differential Diagnosis	Influenza, viral hepatitis, staph or Gram-negative sepsis, toxic shock syndrome, meningococcemia, salmonellosis, shigellosis, rickettsial disease, leptospirosis, borreliosis, psittacosis, dengue, hantavirus pulmonary syndrome, malaria, trypanosomiasis, septicemic plague, rubella, measles and hemorrhagic smallpox.			
Clinical Criteria for a Suspect Case	Acute onset of fever ($\geq$101° F) for less than 3 weeks duration in a severely ill patient with any two of the following: hemorrhagic or purpuric rash, epistaxis, hematemesis, hemoptysis, blood in stool, or other hemorrhagic signs/symptoms; and no known predisposing factors for hemorrhagic manifestations.			
Laboratory Tests/ Sample Collection	If patient meets the clinical criteria for a suspect case, no routine specimens should be sent to the lab until infection control and lab personnel are notified to plan transport, lab containment, and disinfection. VHF diagnostic tests are available only at CDC. Contact local health department to arrange for specimen transport.			
Treatment	Supportive care	Ribavirin; supportive care	Ribavirin; supportive care	Supportive care
Surveillance/ Prophylaxis	Exposed persons, laboratory personnel processing specimens, and high-risk and close contacts (for filoviruses and arenaviruses) should be placed under surveillance for fever for 21 days after potential exposure. If temperature $\geq$101°F, initiate ribavirin therapy unless alternative diagnosis is established or agent is known to be a filovirus or flavivirus.			
Infection Control	For filoviruses, arenaviruses, and suspected VHF of unknown type: follow strict adherence to hand hygiene; use double gloves; impermeable gowns; leg and shoe coverings; face shields and goggles; N-95 masks or better; negative pressure isolation room; restrict access of non-essential staff/visitors; use dedicated medical equipment; disinfect environmental surfaces. For known bunyaviruses and flaviviruses, use standard and contact precautions.			
Public Health	Suspected cases of viral hemorrhagic fever must be reported to the local public health department by the most rapid means available.			

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*Other hemorrhagic fever viruses exist in these categories; however, the viruses listed pose the most serious risk as biological weapons.

Updated 12/16/2004

For more information, refer to: Borio L; Inglesby T; Peters CJ et al. Hemorrhagic Fever Viruses as Biological Weapons: Medical and Public Health Management. *JAMA*. 2002; 287 (18):2391-2405.